

Performance Enhancement of Deicing Systems with the Use of an Anti-Ice Nano-Coating, Phase I

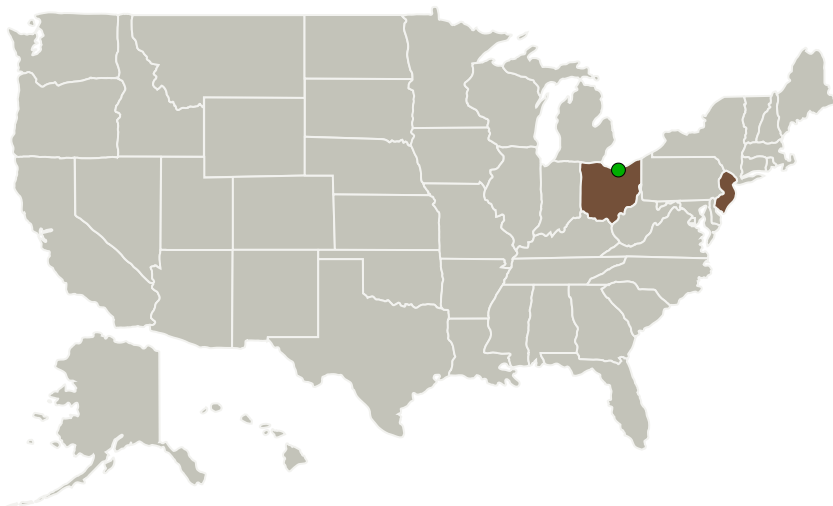
Completed Technology Project (2016 - 2016)



Project Introduction

The proposed program addresses NASA's need for a new generation of icing mitigation technology for manned and unmanned vehicles, particularly related to icing on airframe of flight into supercooled liquid water clouds and regions of high ice crystal density. The state of the art active deicing method on leading edges involves either an electrical, pneumatic or vibration induced debonding of accumulated ice. With the advent of icephobic nanocoatings, there have been attempts to develop a durable passive anti-ice coating. However, success to date has been limited. The state of the art can be advanced if anti-ice coatings can be made more durable, and are made to function synergistically with active de-icing techniques. The advantages are reduced power consumption, improved service life of mechanical components, lighter electronics and extra protection in case of failure of active device. Working in collaboration with a manufacturer of low power ice protection systems for commercial and military aircraft, we propose in Phase I to demonstrate the feasibility of incorporating a durable anti-ice coating with an active deicing device. The proposed program builds upon NEI's core competency of introducing desirable functionalities into engineered coatings. The anti-ice/deicing performance will be tested at our collaborator's icing wind tunnel. The objective of the Phase II program will be to further refine the coating composition and coating deposition process, as well as the configuration of the baseline active deicing device so as to deliver a working prototype of an integrated ice protection system that combines a passive anti-ice coating and an active deicing device.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
NEI Corporation	Lead Organization	Industry Small Disadvantaged Business (SDB)	Piscataway, New Jersey
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

New Jersey	Ohio
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Project Transitions

**June 2016:** Project Start**December 2016:** Closed out

Closeout Documentation:

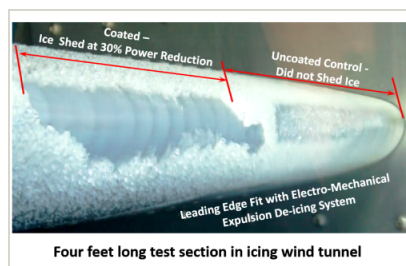
- Final Summary Chart(<https://techport.nasa.gov/file/139621>)

Images



Briefing Chart Image

Performance Enhancement of Deicing Systems with the Use of an Anti-ice Nano-coating, Phase I
(<https://techport.nasa.gov/image/134328>)



Final Summary Chart Image

Performance Enhancement of Deicing Systems with the Use of an Anti-ice Nano-coating, Phase I
Project Image
(<https://techport.nasa.gov/image/131146>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

NEI Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

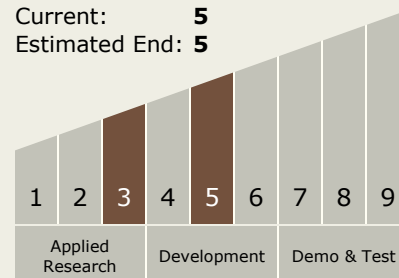
Carlos Torrez

Principal Investigator:

Jiong Liu

Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.8 Ground and Flight Test Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System